

Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see [Authors & Referees](#) and the [Editorial Policy Checklist](#).

Statistical parameters

When statistical analyses are reported, confirm that the following items are present in the relevant location (e.g. figure legend, table legend, main text, or Methods section).

n/a Confirmed

- ☐ ☒ The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
- ☐ ☒ An indication of whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
- ☐ ☒ The statistical test(s) used AND whether they are one- or two-sided
Only common tests should be described solely by name; describe more complex techniques in the Methods section.
- ☒ ☐ A description of all covariates tested
- ☒ ☐ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
- ☐ ☒ A full description of the statistics including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
- ☒ ☐ For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
Give P values as exact values whenever suitable.
- ☒ ☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
- ☒ ☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
- ☒ ☐ Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated
- ☒ ☐ Clearly defined error bars
State explicitly what error bars represent (e.g. SD, SE, CI)

Our web collection on [statistics for biologists](#) may be useful.

Software and code

Policy information about [availability of computer code](#)

Data collection

For spear data processing MATLAB 2016 (<https://bitbucket.org/adrlab/procesing>) and RCARS (<https://bitbucket.org/adrlab/rcars>) were used

Data analysis

For simple statistical analysis Microsoft Excel 2016 was used.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors/reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

Figures with associated raw data are in SI only: 4, 5, 8, 9, 12, 18, 25-29; No data with mandated deposition; The data that support the findings are presented in the Supplementary Information. The original datasets are available upon request.

Field-specific reporting

Please select the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/authors/policies/ReportingSummary-flat.pdf](https://www.nature.com/authors/policies/ReportingSummary-flat.pdf)

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	The aim of the ballistic experiment was to answer the question whether the observed lesion can be reproduced with a wooden thrusting spear. Against this background, the target-sample size in the ballistic experiment was stipulated to ten, a number considered to suffice simple statistical analysis.
Data exclusions	None of the data were excluded.
Replication	To ensure reproducibility of the ballistic experimental findings, the relevant physical parameters were monitored due to the technical design of the thrusting spear. The bone targets were standardized in terms of organic material used, size, embedding material, arrangement and set-up. All parameters are described in detail in methods and SI.
Randomization	This is not relevant as allocating experimental groups was not part of the experimental design.
Blinding	Blinding was not relevant due to the absence of experimental grouping as part of the experimental design.

Reporting for specific materials, systems and methods

Materials & experimental systems

n/a	Involved in the study
☒	☐ Unique biological materials
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☐	☒ Palaeontology
☒	☐ Animals and other organisms
☒	☐ Human research participants

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Palaeontology

Specimen provenance	The specimens come from the archaeological site of Neumark Nord. The permission to study the Neumark Nord 1 and 2 assemblages was granted to MONREPOS - Archaeological Research Center and Museum for Human Behavioural Evolution by Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt/Landesmuseum für Vorgeschichte, Halle, Germany in 2008.
Specimen deposition	The specimens are currently stored at MONREPOS - Archaeological Research Center and Museum for Human Behavioural Evolution, Neuwied, Germany with permission of Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt/Landesmuseum für Vorgeschichte, Halle, Germany.
Dating methods	No direct dating method was applied.

☐ Tick this box to confirm that the raw and calibrated dates are available in the paper or in Supplementary Information.